



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

09/398,502

09/17/1999

HABIB RIAZI

3-11-3

1176

46303 7590 07/11/2007
RYAN, MASON & LEWIS, LLP
1300 POST ROAD, SUITE 205
FAIRFIELD, CT 96824

EXAMINER

DUONG, DUC T

ART UNIT

PAPER NUMBER

2616

MAIL DATE

DELIVERY MODE

07/11/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

09/398,502

Applicant(s)

RIAZI ET AL.

Examiner

Duc T. Duong

Art Unit

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sayeed (US Patent 6,594,320 B1).

Regarding to claims 1 and 7, Sayeed discloses an orthogonal frequency division multiplexing OFDM transmitter (fig. 1) for transmitting an OFDM signal having a plurality of sub-carriers (col. 4 lines 9-21), comprising a differential encoder 130 for modulating said OFDM signal in the frequency domain using adjacent sub-carriers to produce differentially encoded symbols (fig. 1 col. 4 lines 31-33); an IFFT buffer 140 for storing said differentially encoded symbols and one or more spectral null to produce an analog signal centered at a desired carrier frequency (fig. 4a-c col. 4 lines 36-60); and a transformer 150 for creating said OFDM signal (fig. 1 col. 5 lines 61-65).

Sayeed fails to teach for storing pilot tones. However, to arrange for storing pilot tones instead of spectral nulls would have been obvious to a person of ordinary skill in the art since such arrangement would the same purpose of carrier acquisition, and thus it lacks any new inventive concept.

Regarding to claims 2 and 8, Sayeed discloses the transformer 150 implements an Inverse Fast Fourier Transform (fig. 1 col. 5 lines 6-8).

Regarding to claims 3 and 9, Sayeed discloses the transformer 150 implements an orthogonal transformation (it is inherent in OFDM system the transformer implements an orthogonal transformation).

Regarding to claims 4 and 10, Sayeed discloses the transformer 150 generates said OFDM signal with a plurality of sub-carriers for carrying data (fig. 1 col. 4 lines 36-55).

Regarding to claims 5 and 11, Sayeed discloses at least one unmodulated sub-carrier (spectral null) generated by said transforming step is allocated as a pilot bin to provide a reference within each OFDM symbol (fig. 4a col. 4 lines 39-42).

Regarding to claims 6 and 12, Sayeed discloses the differential encoding 130 is performed with respect to consecutive sub-carriers in said OFDM system (fig. 2 col. 4 lines 31-33; noted the equation deriving the complex elements suggest of consecutive sub-carriers processing).

Regarding to claims 13 and 18, Sayeed discloses an orthogonal frequency division multiplexing OFDM receiver (fig. 20 for receiving an OFDM signal having a plurality of sub-carriers (col. 5 lines 39-46), comprising a transformer 220 for recovering said OFDM signal having a plurality of sub-carriers (fig. 2 col. 5 lines 46-48), wherein said recovered signal contains differentially encoded symbols and one or more spectral nulls and wherein said recovered signal is centered at a desired carrier frequency (fig. 4a-c col. 5 lines 48-50); and a differential decoder 230 for demodulating said OFDM signal in the frequency domain wherein said differential decoding is performed using adjacent sub-carriers (fig. 2 col. 5 lines 51-55).

Sayed fails to teach for storing pilot tones. However, to arrange for storing pilot tones instead of spectral nulls would have been obvious to a person of ordinary skill in the art since such arrangement would the same purpose of carrier acquisition, and thus it lack any new inventive concept.

Regarding to claims 14 and 19, Sayeed discloses the transformer 220 implements a Fast Fourier Transform (fig. 2 col. 5 lines 46-48).

Regarding to claims 15 and 20, Sayeed discloses the transformer 220 implements an orthogonal transformation (it is inherent in OFDM system the transformer implements an orthogonal transformation).

Regarding to claims 16 and 21, Sayeed discloses at least one unmodulated sub-carrier (spectral null) generated by said transforming step is allocated as a pilot bin to provide a reference within each OFDM symbol (fig. 4a col. 4 lines 39-42).

Regarding to claims 17 and 22, Sayeed discloses the differential decoding 230 is performed with respect to consecutive sub-carriers in said OFDM system (fig. 2 col. 4 lines 31-33; noted the equation deriving the complex elements suggest of consecutive sub-carriers processing).

Response to Arguments

3. Applicant's arguments filed April 4, 2005 have been fully considered but they are not persuasive. While examiner agreed with the applicant by definition that a pilot tone is a sinusoid frequency that conveys information and that a spectral null is a lacks of signal. However, in this instant, the uses of both the pilot tone and spectral null serve

Art Unit: 2616

the same purpose for carrier acquisition, the examiner find no new inventive concept as a result.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Duc T. Duong whose telephone number is 571-272-3122. The examiner can normally be reached on M-F (9:00 AM-6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy D. Vu can be reached on 571-272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DD
DD



HUY D. VU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600